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January 4, 1999

BY HAND DELIVERY
Magalie Salas, Esquire
Secretary
Federal Communications Commission
1919 M Street, N.W.
Room 222
Washington, D.C. 20554

Re: ET Docket No. 98-156

Dear Ms. Salas:

Enclosed are the original and nine copies of the Comments of Sierra Digital Communications, Inc. for filing in the above-referenced docket.

Kindly date-stamp and return the extra copy of this cover letter.

If there are any questions about this filing, please call me at the number above.

Respectfully submitted,

Mitchell Lazarus
Counsel for Sierra Digital Communications, Inc.

ML/dd
Enclosures
cc: Service List

No. of Copies rec'd 0+9
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Before the
Federal Communications Commission
Washington DC 20554

In the Matter of	)	
	)	
Amendment of Part 15 of the Commission's	)	ET Docket No. 98-156
Rules to Allow Certification of Equipment	)	RM-9189
in the 24.05-24.25 GHz Band at Field	)	
Strengths up to 2500 mV/m	)	

REPLY COMMENTS OF
SIERRA DIGITAL COMMUNICATIONS, INC.

Mitchell Lazarus

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REPLY COMMENTS OF
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Sierra Digital Communications, Inc. (Sierra) submits these Reply Comments in the above-captioned proceeding.[1] The Commission's Notice proposed increasing the allowable field strength for unlicensed operation at 24.05-24.25 GHz to 2500 mV/m at 3 meters, provided that antenna gain is at least 33 dBi.[2] For higher gain antennas, output power would have to be reduced to maintain a maximum field strength of 2500 mV/m.[3]

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[1] Certification of Equipment in the 24.05-24.25 GHz Band, ET Docket No. 98-156, Notice of Proposed Rule Making, FCC 98-209 (released Sept. 1, 1998) (Notice). Sierra filed the Petition for Rule Making in RM-9189 that led to the Notice.

[2] Notice at ¶ 13.

[3] *Id.* The Commission excluded the 24.00-24.05 GHz band segment to protect low-power amateur operations on the proposed Phase 3D satellite. Sierra's first-round Comments showed that unlicensed point-to-point operation is extremely unlikely to interfere with amateur satellite operations, and urged the Commission to extend directional 2500 mV/m operation to include the 24.00-24.05 GHz segment. To reduce the extremely low odds of interference even further, Sierra noted that most amateur stations are located in residential areas, and offered to support rule language that prohibits use of point-to-point equipment at 24.00-24.05 GHz at residential sites. Finally, although it should not be necessary, the Commission could eliminate any possibility of interference by barring point-to-point operations at 24.048-24.049 GHz, the only part of the band in which the satellite will actually operate. *See* http://www.amsat-dl.org/p3dqrg.html.

First-round comments were filed by Teligent, Inc., the American Radio Relay League, Inc., and Sierra.[4] Among all users of the band, only ARRL objects to the Notice. As we show below, ARRL greatly overstates any realistic threat of interference.

A. A 10 MHz Guard Band is Unnecessary.

Teligent requests a 10 MHz guard band at the upper end of the 24 GHz Part 15 band to protect Teligent's planned facilities at 24.25-24.45 and 25.05-25.25 GHz.[5] Teligent also asks the Commission to implement the proposed frequency stability requirement of 0.003%.[6]

A guard band is unnecessary. Point-to-point equipment at 24 GHz will have to meet stringent out-of-band limits from 24.25 GHz upward.[7] This proceeding does not affect the level of background interference Teligent's equipment must accept. If Teligent wishes to avoid interference from properly-operating 24 GHz point-to-point transmitters, it must design its receivers to reject out-of-band signals near the band edges. To shrink 24 GHz point-to-point spectrum merely so that Teligent can deploy less efficient receivers would be patently unfair.

Sierra does, however, appreciate Teligent's concern about unlicensed transmitters drifting into Teligent's band.[8] To help forestall that possibility, Sierra would support the Commission's tightening the proposed 0.003% frequency stability to 0.001%.

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[4] Comments of Teligent, Inc. (filed Dec. 7, 1998) (Teligent Comments); Comments of the American Radio Relay League, Inc. (filed Dec. 7, 1998) (ARRL Comments); Comments of Sierra Digital Communication, Inc. (filed Dec. 7, 1998) (Sierra Comments).

[5] Teligent Comments at 2.

[6] *Id.* at 1-2.

[7] The applicable limit is 500 μV/m at 3 meters. 47 C.F.R. § 15.209(a).

[8] Teligent Comments at 4.

B. ARRL's Concerns About Interference are Greatly Exaggerated.

ARRL expresses concern that 24 GHz unlicensed point-to-point operation will interfere with amateur radio operations.[9] ARRL makes much the same points here as it did in opposing Sierra's Petition for Rule Making. After reviewing those filings, however, the Commission concluded, "We do not believe that ARRL has demonstrated that there will be significant risk of interference to Amateur operations in the 24.05-24.25 GHz band segment."[10]

Sierra does not dispute the importance of amateur radio communications, but believes ARRL has greatly overstated the risk of interference.

ARRL claims primarily that the longer path lengths of directional antennas will create an increased likelihood of interference.[11] ARRL fails to appreciate that the proposed rule actually **reduces** the area over which harmful interference might occur, relative to omnidirectional operation at 250 mV/m under the present rules.[12] The combination of a 33 dBi antenna and tenfold increase in field strength (over the present rules) changes the shape of the interference contour from a circle to a longer, narrower sector shape whose area is smaller than the circle.

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[9] ARRL Comments at 4-12.

[10] Notice at ¶ 10.

[11] ARRL Comments at 4-5, 7, 9, 10.

[12] *See* Notice at ¶ 5. Comparing directional operation at 2500 mV/m (proposed rule) and omnidirectional operation at 250 mV/m (present rule), the areas subject to harmful interference are equal if the directional beamwidth is 3.6 degrees. (This result is independent of the signal strength specified for the harmful-interference contour.) With a directional antenna gain of 33 dBi, as proposed here, the beamwidth is 3.5 degrees, so that the area subject to harmful interference is smaller than it is under the present rule.

ARRL's concerns are therefore misplaced: The rule change does not increase the risk of interference to amateur stations.

ARRL objects to this area-of-interference analysis, but the only ground it cites is irrelevant: namely, the Commission's having last adopted this analysis in connection with 2.4 GHz spread spectrum, which has a lower potential for interference.[13] The Commission cited that precedent only for the validity of assessing interference risk by comparing the areas of interference contours. The same comparison is equally valid for narrowband technology. In any event, the rules proposed here certainly acknowledge the differing interference potentials between narrowband technology and spread spectrum, by holding the field strengths here to 21 dB below those allowed for spread spectrum in the 2.4 GHz band.[14]

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[13] ARRL Comments at 6-7. In Spread Spectrum Transmitters, 12 FCC Rcd 7488, 7498, ¶ 17 (1997), the Commission adopted a 1 dB power penalty per 3 dB antenna gain on the ground that the area of interference contour would be unchanged.

[14] The 21 dB figure is derived as follows. Spread spectrum at 2.4 GHz can use 1 watt output power, but must reduce that power by 1 dB for each 3 dB that the antenna gain exceeds 6 dBi. 47 C.F.R. § 15.247(b)(3)(i). For an antenna gain of 33 dBi, as proposed here, the required power reduction is (33-6)/3 = 9 dB, yielding a maximum output power of 126 milliwatts. Into a 33 dBi antenna, that produces an EIRP of 251 watts, equivalent to a field strength of 29 volts/meter at 3 meters. The proposed 2500 mV/m limits for 24 GHz point-to-point operations are 21 dB lower — a substantial penalty for narrowband operation.

ARRL also objects to Sierra's statement that the 1 mW output power levels proposed here are less than the 1 watt permitted to 5 GHz spread spectrum. ARRL Comments at 1 n.1. Again, ARRL argues that spread spectrum causes less interference than narrowband transmissions, other things being equal. But other things are not equal. The proposed output power here is 30 dB below that allowed for 5 GHz spread spectrum. Moreover, 5 GHz spread spectrum can use unlimited antenna gain, with no penalty in output power. A 1 watt spread spectrum signal into a 33 dBi antenna produces a field strength of 82 volts/meter — again, 30 dB higher than that proposed here. ARRL's point that spread spectrum is less likely to interfere than narrowband is unquestionably true, but has been thoroughly accounted for by the different emissions permitted for the two technologies.

ARRL also disagrees with a comparison between the proposed field strength limits for point-to-point operation and the present limits for field disturbance sensors. ARRL claims that signals from field disturbance sensors have a high "decay factor," which, it says, gives those devices a "far lower interference potential to licensed services due to limited range."[15] Sierra does not understand this assertion. Path loss is independent of output power and antenna gain. The "decay factor" is necessarily the same for any electromagnetic wave at a given frequency, whether produced by a field disturbance sensor or a point-to-point transmitter. Both types of devices, if they set up equivalent field strengths, will create equal interfering signals at equal distances.[16]

C. ARRL's Proposed Conditions Are Unnecessary, Impractical, and Unlawful.

ARRL has requested further conditions that would not only shift the user's compliance obligations to the manufacturer, but also require the manufacturer to undertake the combined roles of frequency coordination agency and FCC enforcement bureau.[17] These conditions are

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[15] ARRL Comments at 4.

[16] In a footnote, ARRL asks the Commission to exempt the frequencies 24.190-24.195 GHz if it otherwise adopts the proposals in the Notice. ARRL Comments at 8 n.6. In view of the considerations discussed in text, this step is not needed to protect amateur operations from interference. And, as ARRL must recognize, walling off these frequencies near the middle of the band would greatly reduce its usefulness for Part 15 operations.

[17] ARRL asks the Commission to "require any manufacturer of such [24 GHz point-to-point] devices to maintain a record of purchasers, location of facilities, frequencies, emissions, bandwidths, path lengths and azimuths, antenna gain and height, and to furnish these lists periodically to [ARRL], to be made available to radio amateurs for coordination purposes. Those manufacturers would also have to be required to cause the frequency of the device to be changed in order to resolve interference incidents when experienced, or to terminate the path where the interference cannot be resolved. Any action in this proceeding should be suspended until such time as the manufacturers of these devices develop spectrum etiquette plans acceptable to [ARRL]. Finally, the Commission must provide firm assurance that it will immediately, upon complaints of actual interference that cannot be resolved rapidly by contacting the operator of the device, order the manufacturer of the device, and its operator, to cause operation to cease without

unnecessary because, as explained above, ARRL has greatly exaggerated the risk of interference to amateur operations. The conditions are impractical because manufacturers have no way to gather and update the data that ARRL wants them to maintain. (Moreover, because there are likely to be multiple manufacturers marketing through value-added resellers, the manufacturers may not even know who the ultimate users of their products are, let alone the technical details of the users' operations.) ARRL's proposed conditions are unlawful because manufacturers have no legal authority to shut down their customers' operations. Finally, the suggestion of a spectrum etiquette makes no sense for a service operating between fixed locations.

Sierra agrees that Part 15 users are under an affirmative obligation not to cause interference to the licensed services, including the Amateur Radio Service, and to cease operations if the interference cannot be resolved in any other way. Sierra will undertake to educate its customers as to these obligations, and will encourage its value-added resellers to do the same. In addition, Sierra would support a rule provision requiring 24 GHz point-to-point equipment to be frequency agile and retunable in the field, to help mitigate any instances of interference that do occur.

D. Other Issues Raised by ARRL Have No Place in This Proceeding.

ARRL makes a number of other points that are irrelevant to this proceeding or beyond its scope.

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delay, until all interference to the Amateur Service is resolved to the satisfaction of the Amateur licensee." ARRL Comments at 11.

1. *The legality of Part 15 is not at issue in this proceeding.*

ARRL asserts that the Commission has no legal authority to permit the operation of unlicensed devices, apart from certain narrow exceptions.[18] Neither Congress nor any court has ever shared these doubts. If ARRL seeks an adjudication of the issue, it should file an appropriate Petition for Declaratory Ruling so that all interested parties may participate.

Equally unsupported is ARRL's proposition that Part 15 authority is valid only if the Commission has considered all other alternatives and found them wanting.[19] ARRL does not cite any legal authority for this position, and of course there is none.

2. *The Commission's rejection of a superficially similar proposal in 1980-83 is not controlling today.*

ARRL argues that 1980 and 1983 Commission decisions against higher-power unlicensed service at 24 GHz preclude consideration of the present Notice.[20] Those decisions have no bearing here, for the following reasons.

First, the decisions are 16 and 19 years old. They predate almost two decades of dramatic change in Part 15 equipment and services. The Commission should not hesitate to overrule an outmoded decision, especially in the face of a rapidly changing technological environment.

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[18] ARRL Comments at 5-6 & n.3, 8 n.5, 11.

[19] ARRL Comments at 8.

[20] ARRL Comments at 1-3, *citing* Operation of Low Power, Limited Coverage Systems, 45 Fed. Reg. 55775 (Aug. 21, 1980) (Further Notice); 94 F.C.C.2d 32 (1983) (Second Report and Order).

Second, the point-to-point operations the Commission declined to bring under Part 15 in 1980 would have been authorized at 100 milliwatts output power -- more than 100 times the power proposed in the present Notice.[21]

Third, the 1980 Further Notice quoted by ARRL limited Part 15 treatment to devices that were "widely distributed to the general public."[22] Even if that were a precondition for Part 15 regulation in 1980, it certainly is not today. Hundreds of Part 15 products on the market are intended only for commercial or industrial applications, and no one can seriously argue they are ineligible for certification under Part 15.

Fourth, the basis for the 1983 reconsideration is likewise inapplicable. The Commission refused to revisit its 1980 decision mainly because NTIA opposed the proposed use of the band.[23] But NTIA has expressed no such opposition here. Sierra served its original Petition for Rule Making on NTIA, but NTIA neither participated at that stage nor responded to the present Notice. It is fair to conclude NTIA no longer holds the objections it did in 1983.

In short, the 1980 and 1983 decisions relied on by ARRL have no bearing on this proceeding.

3. *ARRL's Views on the costs and delays of Part 101 licensing are immaterial.*

ARRL disputes the Commission's tentative finding that licensing delays, frequency coordination, antenna size, and propagation characteristics all play a significant role in choosing

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[21] Operation of Low Power, Limited Coverage Systems, 81 F.C.C.2d 140, 141 (1980) (First Report and Order).

[22] Further Notice, 45 Fed. Reg. 55775 at ¶ 5 n.3.

[23] Second Report and Order 94 F.C.C.2d at 35.

an operating band, and that operation under Part 101 or above 40 GHz may entail difficulties.[24] The sole evidence that ARRL offers, however, is an anecdote that ARRL's counsel once obtained a Part 101 license relatively quickly.[25]

In fact, the spectrum available for point-to-point services has steadily shrunk in recent years, largely to meet the spectrum needs of various satellite services, even though the demand for point-to-point facilities has continued to grow. Recent reallocations include, for example, the 12.2-12.7 GHz band from the fixed services to the direct satellite broadcast service,[26] the 1850-1990 and 2110-2200 MHz bands from the fixed services to PCS and mobile satellite services;[27] the 27.7-29.7 and 31 GHz band to LMDS and to satellite services;[28] and the proposed designation of the upper 6 GHz band (6700-7075 MHz) for mobile satellite feeder links.[29] The limited bandwidth still available for point-to-point use has become extremely congested and difficult to coordinate. Adoption of the proposed rules is badly needed in part to take pressure off Part 101 spectrum.

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[24] Notice at ¶ 12.

[25] ARRL Comments at 5.

[26] Report and Order, Gen. Docket No. 80-603, 51 RR 2d 1341 (1982).

[27] Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies, 7 FCC Rcd 6886 (1992); Second Report and Order, 8 FCC Rcd 6495 (1993); Third Report and Order, 8 FCC Rcd 6589 (1993).

[28] Amendment of Parts 1, 2, 21 and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, CC Docket No. 92-297, First Report and Order, FCC 96-311, 11 FCC Rcd 19005 (1996).

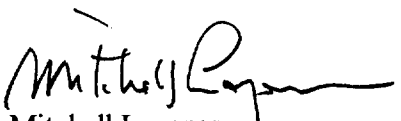
[29] Amendment of Parts 2, 25 and 97 of the Commission's Rules with Regard to Mobile Satellite Service Above 1 GHz, Notice of Proposed Rulemaking, ET Docket 98-142, released on August 4, 1998.

In any event, users are the best judge of which equipment and frequency bands will best meet their own needs. Neither the Commission nor ARRL should make those decisions for others. A Part 15 option is fully warranted where, as here, it presents minimal risk of interference to licensed services and is otherwise in the public interest.

CONCLUSION

For the reasons given above, the Commission should adopt its proposed rule. For the reasons given in Sierra's first-round comments, the Commission should include the 24.00-24.05 GHz band segment. Sierra will support provisions that tighten the proposed 0.003% frequency stability to 0.001% and require equipment to be frequency agile and retunable in the field.

Respectfully submitted,



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January 4, 1999

CERTIFICATE OF SERVICE

I, Delphine I. Davis, a secretary in the law firm of Fletcher, Heald & Hildreth, P.L.C. do hereby certify that a true copy of the foregoing "Reply Comments of Sierra Digital Communications, Inc." was sent this 4th day of January, 1999, by first-class United States mail, postage prepaid, to the following:

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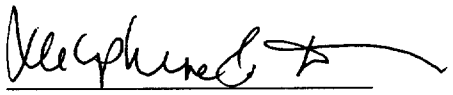

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